

*Citations from PATENT ABSTRACTS OF JAPAN: PJI*

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**1. NDN 190-0102-7462-6: BONDING OF HYDROGENATED NITRILE RUBBER COMPOUND AND FIBER PUBLICATION NUMBER- 04198325 JP**

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**1. BONDING OF HYDROGENATED NITRILE RUBBER COMPOUND AND FIBER**

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**APPLICANT(S)- BANDO CHEM IND LTD**

**PUBLICATION COUNTRY- Japan.**

**PURPOSE:** To enable the bonding of a fiber and a hydrogenated nitrile rubber compound useful for tire, etc., in high adhesivity and peel strength by contacting and vulcanizing a specific hydrogenated nitrile rubber compound and a specific fiber material.

**CONSTITUTION:** A hydrogenated nitrile rubber compound having a hydrogenation degree of 80-99% and containing preferably 5-60 pts.wt. (based on 100 pts.wt. of the rubber) of an ethylenic unsaturated carboxylic acid metal salt (e.g. zinc acrylate ) and preferably 0.2-10 pts.wt. of an organic peroxide (e.g. dicumyl peroxide) is bonded to a fiber material such as aromatic polyamide fiber by treating the fiber material with a treating solution containing a urethane- modified epoxy compound and a hardener for epoxy compound, treating with a mixture of resorcinol, formalin and a rubber latex, contacting with the above hydrogenated nitrile rubber compound and vulcanizing the product.

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**1. Resin compositions and molded products thereof.**

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**EXEMPLARY CLAIMS**- A resin composition comprising:

100 parts by weight of a mixture comprising

(a) from 50 to 95% by weight of polyamide;

(b) from 50 to 5% by weight of a thermoplastic polyester obtained by condensation polymerisation carried out using as main components, a dicarboxylic acid or an ester forming derivative thereof, and a diol or an ester forming derivative thereof.

(c) from 0.5 part to 40 parts by weight of a modified polyolefin formed by graft polymerization of:

(i) 1 to 50% by weight of an addition polymer having at least one peroxy bond in any of a backbone chain or a side chain or both of these, said addition polymer having an average molecular weight of from 1000 to 200,000, and containing from 0.5 to 30% by weight of constituent units derived from monomers containing a peroxy bond; with

(ii) 50 to 99% by weight of an olefin copolymer having as main monomer components, ethylene, an alpha-olefin or diene having 3 to 20 carbon atoms, and containing 0.001 to 70% by weight, based on modified polyolefin, of monomer units having at least one kind of functional group selected from a carboxylic acid group, a carboxylic acid metal salt group, a carboxylic acid ester group, an acid anhydride group, an epoxy group, an acid amide group and an imide group, represented by Formulae (I) to (VI) shown below.

wherein R(sub)1 to R(sub)4 each represents a hydrogen atom or an aliphatic, alicyclic or aromatic residual group having 1 to 30 carbon atoms, and M represents a mono- to trivalent metal.

A resin composition according to Claim 1 wherein the thermoplastic polyester is selected from polyethylene terephthalate, polyethylene naphthalate, polypropylene terephthalate, polybutylene terephthalate,

polyhexamethylene terephthalate, polycyclohexanedimethylene terephthalate, a poly(ethylene terephthalate/ethylene isophthalate) copolymer and a poly(butylene terephthalate/butylene dodecadioate) copolymer.

A resin composition according to Claim 1 or 2, wherein the concentration ratio of terminal amino groups to terminal carboxyl groups in said polyamide is 1.5 or more.

A resin composition according to any one of Claims 1 to 3, wherein the polyamide is at least one of polycaproamide, polyhexamethylene adipamide, polyhexamethylene sebacamide, polyundecamethylene adipamide, polyhexamethylene dodecamide, polyundecanamide, polydodecanamide, and a copolymerized polyamide or mixed polyamide of any of these.

A resin composition according to any one of Claims 1 to 4, wherein the polyamide have a relative viscosity ranging from 2.0 to 5.0 at 25(degree)C, measured on a 1% solution in concentrated sulfuric acid.

A resin composition according to any one of Claims 1 to 5, wherein the thermoplastic polyester has a relative viscosity ranging from 1.15 to 2.5, measured at 25(degree)C on a 0.5% solution in orthochlorophenol.

A resin composition according to any one of Claims 1 to 6, which contains from 50 to 90% by weight of component (a) and from 50 to 10% by weight of component (b).

A resin composition according to Claim 7 which contains from 1 to 35 parts by weight of component (c) per 100 parts by weight of component (a) plus component (b).

A resin composition according to any one of Claims 1 to 8 wherein said resin composition further contains (d) from 0.3 to 20 parts by weight of ethylenedimelamine.

A molded product comprising a resin composition according to any one of Claims 1 to 9 wherein said thermoplastic polyester particles have an average particle diameter of 2 (small mu)m or less, being dispersed in said molded product.

A resin composition according to any of Claims 1 to 10 wherein said function-group-containing monomer is an (alpha),(beta) - unsaturated carboxylic acid derivative selected from the group consisting of acrylic acid, methacrylic acid, maleic acid, fumaric acid, itaconic acid, crotonic acid, methylmaleic acid, methylfumaric acid, mesaconic acid, citraconic acid, glutaconic acid, methyl hydrogen maleate, methyl hydrogen itaconate, methyl acrylate, ethyl acrylate, butyl acrylate, 2-ethylhexyl acrylate, hydroxyethyl acrylate, methyl methacrylate, 2-ethylhexyl methacrylate, hydroxyethyl methacrylate, aminoethyl methacrylate, dimethyl maleate, dimethyl itaconate, sodium methacrylate, potassium methacrylate, magnesium methacrylate, zinc methacrylate, sodium acrylate, magnesium acrylate, zinc acrylate, maleic anhydride, itaconic anhydride, citraconic anhydride, endobicyclo- $\phi$ 2,2,1<sup>!</sup>-5-heptene-2,3-dicarboxylic acid, endobicyclo- $\phi$ 2,2,1<sup>!</sup>-5-heptene-2,3-dicarboxylic anhydride, glycidyl acrylate, glycidyl methacrylate, acrylglycidyl ether, vinylglycidyl ether, vinyl acetate and acrylamide; and N-substituted compounds obtained by addition of ammonia, methylamine, ethylamine, butylamine, hexylamine, dodecylamine, oleylamine, stearylamine, cyclohexylamine, benzylamine, aniline, naphthylamine, dimethylamine, diethylamine, methylethylamine, dibutylamine, distearylamine, dicyclohexylamine, ethylcyclohexylamine, methylaniline, phenylnaphthylamine, melamine, ethanolamine, 3-amino-1-propanol, diethanolamine, morpholine, (alpha)-amino-1-pyrrolidone, (alpha)-amino-(epsilon)-caprolactam, (alpha)-monomethylamino-(epsilon)-caprolactam, (alpha)-monoethylamino-(epsilon)-caprolactam, (alpha)-monobenzylamino-(epsilon)-caprolactam or an amino group terminated nylon 6 oligomer, to said (alpha),(beta)-unsaturated carboxylic acid.

A resin composition according to Claim 1 or Claim 11 wherein said alpha-olefin is selected from the group consisting of propylene, butene-1, pentene-1, 4-methylpentene-1, isobutylene, 1,4-hexadiene, dicyclopentadiene, 2,5-norbornadiene, 5-ethyl-2, 5-norbornadiene, 5-ethylidenenorbornene, 5-(1'-propenyl)-2-norbornene, butadiene and isoprene.